Appendix E

ICDF 60% Design Components — Document Review, Comment, Resolution Table – IDEQ

ICDF 60% DESIGN PACKAGE

DOCUMENT REVIEW, COMMENT, RESOLUTION LIST - IDEQ

DOCUMENT TITLE: 60 Percent Design Components, ICDF Master Table of Documents, Draft DOE/ID-10925

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
1	App A, ICDF Cell 2 Excavation Sequence	Sheet C-303, 2 of 2	a) Please provide text and calculations for the runoff volume capacity of the temporary runoff control berm. From an ALARA standpoint, it would be prudent to place this berm directly onto the operations layer. Please consider this approach. b) **Detail 3/C-302 "Cell 2 Excavation/Cell 1 Liner Edge Exposure":** The Temporary Runoff Control Berm appears to have dimension arrows for the height of the temporary berm, but has no associated dimension. Please indicate the height of this berm. c) The leachate riser pipes will be subject to a great deal of stress, especially at the Cell 1: 2 interface. This area, per detail 5 on this Sheet, is a critical point of potential subsidence and deflection of the riser is a concern. Consideration should be given to additional protection of the riser's internal diameter as it relates to the extraction and re-installation of leachate/ liquid pumps. An additional "collar" (concrete culvert section(s)) would aid in dissipating the loading anticipated on these structures.	The runoff control berm that will function during operation of the landfill is placed directly over the operations layer as shown on Drawing C-303, Sheet 1 of 2. During construction excavation for Cell 2, this berm is removed to expose the liner edge of Cell 1 for connection to Cell 2. When it is removed, the material would be pushed up against the waste slope to act as a temporary construction diversion for runoff from the waste slope. Note that this temporary runoff control berm would only be used where the edge of waste is at the hold-back point shown in the drawing. Due to the desire to maintain a continuous placement volume in the ICDF during operation, it is very likely that Cell 2 construction would occur well in advance of the waste toe reaching the 15 foot hold-back point all along the cell edge. The capacity of this temporary diversion is not anticipated to be a design issue as it is temporary in use during one construction season (with very little, if any, runoff anticipated), and it is not anticipated that the waste will be as close as depicted in the drawings all along the Cell 1 edge. Thus the berm needs to function to divert runoff to the open spaces on the lined landfill floor that remain prior to connection to Cell 2. b) The dimension of the temporary runoff control ditch is shown on the drawing (although it is tough to see) at 1 foot deep. This dimension will be clarified for the revised submittal.

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
				c) Comment noted. Note that riser assembly shown on Drawing C-303, Sheet 1 of 2, is a temporary clean-out that will be removed when Cell 2 is constructed for connection of the leachate collection pipe from Cell 1 to Cell 2. This connection will be butt-fusion welded HDPE pipe which can take the waste loads and anticipated settlements predicted for the facility. At the sump locations, the leachate access risers for the pumps will not be experiencing the full load of the landfill waste contents as these pipes are at the edge of the facility. However, these pipes also will be designed to handle all anticipated loads with an adequate safety margin. These calculations will presented in the 90% RD/RA Submittal.
2	App B, Landfill Operations Overview; Sec 1	B-3	Please add a step in this brief outline that addresses recording of the final waste location, as is shown in Figure 1 of Appendix B.	A step will be added to address recording the final waste location in the 90% deliverable.
3	App B, Landfill Operations Overview; Sec 1	B-3; Item 7	This item should identify the empty vehicle/ container weigh-out process before the truck returns to the CERCLA RA site.	A step will be added to include the weigh out process in the 90% deliverable.
4	App B, Landfill Operations Overview; Sec 1	B-3, Item 9a	The compaction of wastes within this landfill after placement will need to have a compaction baseline established by some other "method" than a "number of passes by the waste placement equipment operator". Please reference the appropriate compaction testing that will initially be performed on the wastes and the details of the on-going QC testing program that will be implemented on a given frequency.	Agree. Comment will be addressed by describing compaction study and testing that will be performed initially. Reference will also be made to detailed operating procedures regarding the on-going QC program.

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
5	App B, Landfill Operations Overview; Figure 1		Please add text to Box 7 that identifies weigh-out of the truck and container(s) as necessary.	Text will be added to Box 7 to identify weight out of truck and container.
6	App B, Landfill Operations Overview; Sec 1.1	B-4 thru B-5; list of propose d steps	As previously discussed in the IDEQ's May 5, 2001 comments on the 30 percent Design (Comment # 157), it will be necessary to sample leachate and other liquid waste streams discharged to the pond to ensure compliance with 40 CFR 264.552 (c) (2) and 40 CFR 264.552 (c) (4).	In order to comply with 40 CFR 264.552(c) (2) a SAP will be prepared for the EP. This plan will be supplied in the 90% RD/RA workplan and will be based on operational needs. The data will be available to the agencies on site.
7	App B, Landfill Operations Overview; Sec 1.1	B-4, 2nd bulle t	Please correct the typographical error by replacing *"decontaminated"* with *"decontamination"* water.	Comment will be incorporated in revised 60% document.
8	App B, Landfill Operations Overview; Sec 1.1	B-4, Item 3	The profile sheet should not be the only data used to decide whether TSS acceptable at the ICDF complex. Frequently, when wastewaters in storage are profiled, most of the TSS have *"settled"*. When the wastewaters are transferred out of the storage unit (especially from the tank bottom), the TSS levels rise dramatically. Therefore, a sample should obtained at SSSTF to verify the waste profile.	Our recommendation is a visual observation of significant sediment in the tank along with any observed solids on the bottom of a tank.
9	App B, Landfill Operations Overview; Sec 1.1	B-4, Item 4	a) Replace "*disposed*" at the beginning of this sentence with " *off-loaded.*" b) The text should provide a more detailed description of the procedures to remove TSS at the decontamination pad, or reference the appropriate section of the SSSTF Remedial Design/Remedial Action Work Plan that contains this information.	a) Comment will be incorporated in revised 60% document. b) Text will reference the appropriate sections of the SSSTF RD/RA Work Plan.

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
10	App B, Landfill Operations Overview; Sec 1.1	B-4, Item 5	The "gravity drain" system discussed here appears to conflict with other descriptions throughout the 60% design document which mention that the fluids would be "pumped" (e.g., DOE/ID 10866, Section 2.3, Page 2-1 and Section 5.6.3, Page 5-5). Please clarify.	The gravity drain system refers to drainage from the tank or truck to the offloading sump. In the 30% design, the sump drained by gravity into the evaporation pond. In the 90% design, the offloading sump is pumped to the EP.
11	App C, ICDF Groundwater Monitoring Data Quality Objectives	General	As stated in the IDEQ's written comments on the ICDF 30 Percent Remedial Design (Comment 54 (d)), and discussed among the Agencies during the June 18, 2001 Comment Resolution Meeting, it will be necessary to monitor the uppermost perched aquifer to comply with the substantive portions of 40 CFR 264.97.	Groundwater monitoring is an important component of the ICDF monitoring strategy and towards that, DOE has supported the installation of a tertiary monitoring system beneath the landfill (not required by regulations) as well as new RCRA-compliant monitoring wells in the SRPA. Given the fact that one of the RAOs for the OU 3-13 ROD is to dry up the perched water bodies, it does not seem technically prudent to monitor a water body that is man-made and will not be present in the timeframe when needed. DOE requests additional written technical information, including other sites within Idaho where this is required, that provides the basis for monitoring the perched groundwater. This comment will be addressed in the 90% submittal since it includes the ICDF Groundwater Monitoring Plan.
12	App C, ICDF Groundwater Monitoring Data Quality Objectives, Sec C-1	C-3, 2nd para	Note that 40 CFR 264.98 (g) (4) requires that the substantive requirements of Section 40 CFR 264.99 be addressed if there is statistically significant evidence of contamination at the compliance point.	Agree. The Groundwater Monitoring Plan, which will be included in the ICDF RD/RA Work Plan, will address this.

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
13	App C, ICDF Groundwater Monitoring Data Quality Objectives, Sec C-1	C-3, 4th para, 6th sentence	The fact that contaminants exist in the SRPA beneath INEEL in several locations refutes the transport model's conclusions that it will take hundreds or thousands of years for contaminants to reach the SRPA beneath the ICDF. There are also other examples in Idaho of contaminants impacting aquifers at much greater depths in fractured basalt aquifers within a 30-year period.	Are there other places on the INEEL that have waste in a landfill designed like the ICDF?
14	App C, ICDF Groundwater Monitoring Data Quality Objectives, Sec C-1	C-3, 5th para	As stated above, the USDOE is required to monitor the uppermost perched aquifer to comply with the substantive portions of 40 CFR 264.97. If drain out of the perched aquifer occurs in 12 to 14 years, as predicted, and monitoring does not show a perched water influence from the Big Lost River when there is significant flow in the river, the Agencies will modify the detection monitoring strategy accordingly.	Groundwater monitoring is an important component of the ICDF monitoring strategy and towards that, DOE has supported the installation of a tertiary monitoring system beneath the landfill (not required by regulations) as well as new RCRA-compliant monitoring wells in the SRPA. Given the fact that one of the Remedial Action Objective for the OU 3-13 ROD is to dry up the perched water bodies, it does not seem technically prudent to monitor a water body that is man-made and will not be present in the timeframe when needed. DOE requests additional written technical information, including other sites within Idaho where this is required, that provides the basis for monitoring the perched groundwater. This comment will be addressed in the 90% submittal since it includes the ICDF Groundwater Monitoring Plan.

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
15	App C, ICDF Groundwater Monitoring Data Quality Objectives, Sec C-1	C-4, 1st para	As explained in the IDEQ's May 25, 2001 comments on the 30 Percent Design (Comments 54 a, b, and c), the proposed SRPA monitoring wells are inadequate for detection monitoring at the ICDF complex.	Groundwater monitoring is an important component of the ICDF monitoring strategy and towards that, DOE has supported the installation of a tertiary monitoring system beneath the landfill (not required by regulations) as well as new RCRA-compliant monitoring wells in the SRPA. Given the fact that one of the RAOs for the OU 3-13 ROD is to dry up the perched water bodies, it does not seem technically prudent to monitor a water body that is man-made and will not be present in the timeframe when needed. DOE requests additional written technical information, including other sites within Idaho where this is required, that provides the basis for monitoring the perched groundwater. This comment will be addressed in the 90% submittal; it includes the ICDF Groundwater Monitoring Plan.
16	App C, ICDF Groundwater Monitoring Data Quality Objectives, Sec C-5	C-5, 1st para, 1st sentence	As stated above, and in the IDEQ's May 25, 2001 comments on the 30 percent Remedial Design (Comment 54 d), the IDEQ does not consider the SRPA to be the uppermost aquifer. 40 CFR 264.95 clearly defines the point of compliance as the vertical surface located at the hydraulically down gradient limit of the waste management area which extends to the uppermost aquifer. The waste management area is the horizontal plane of the area on which waste will be placed.	Groundwater monitoring is an important component of the ICDF monitoring strategy and towards that, DOE has supported the installation of a tertiary monitoring system beneath the landfill (not required by regulations) as well as new RCRA-compliant monitoring wells in the SRPA. Given the fact that one of the RAOs for the OU 3-13 ROD is to dry up the perched water bodies, it does not seem technically prudent to monitor a water body that is man-made and will not be present in the timeframe when needed. DOE requests additional written technical information, including other sites within Idaho where this is required, that provides the basis for monitoring the perched groundwater. This comment will be addressed in the 90% submittal since it includes the ICDF Groundwater Monitoring Plan.

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17	App C, ICDF Groundwater Monitoring Data Quality Objectives, Sec C-6	C-6, last sentence	The paragraph states "*Therefore, the determination that a release from the ICDF will not be made solely on SRPA monitoring data alone, and must be confirmed by the vadose zone monitoring data.*" It is not appropriate to pre-judge the value of the data from the SRPA and conclude that it has to be confirmed by data from the vadose zone. Obviously, data from the vadose zone is desirable to confirm data from the SRPA but vadose zone monitoring has a limited volumetric representation whereas aquifer samples benefit from the homogenizing influence of the ground water in the saturated zone. The impact of this statement is exacerbated by the very limited effort described for vadose zone monitoring in the 60% design. This statement requires qualification to note that it is desirable to confirm SRPA sample results with vadose zone monitoring results but it is not mandatory.	Comment will be addressed in the ICDF Groundwater Monitoring Plan to be submitted with the draft ICDF RD/RA Work Plan.
18	App C, ICDF Groundwater Monitoring Data Quality Objectives, Sec C-8	C-7, 1st para	a) The proposed analyte list is inadequate. At a minimum, the following analytical parameters must be included: VOCs (method 8260), SVOCs (method 8270), PCBs, and a full suite of heavy metals (e.g., methods 6010, 7470, 7760) unless wastes that may contain these contaminants are prohibited from disposal at the ICDF complex. b) It should be noted in the schedule that USDOE would be obligated to monitor this facility for as long as wastes remain entombed within the ICDF. With a design life of 1,000 years, the design of the facility is a small fraction of one half-life of the two key contaminants of concern that will be disposed. I-129 and Tc-99 have half-lives of 15,700,000 years and 213,000 years respectively. Groundwater monitoring is a very long-term commitment by USDOE for this facility.	Comment will be addressed in the ICDF Groundwater Monitoring Plan to be submitted with the draft ICDF RD/RA Work Plan.

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
19	App C, ICDF Groundwater Monitoring Data Quality Objectives, Sec C-8	C-7, 2nd para	Please see Comment #15 regarding the adequacy of the proposed SRPA monitoring wells for detection monitoring at the ICDF complex. The following wells are designated as SRPA monitoring wells for the ICDF; USGS-42, USGS-57, USGS-112, and USGS-113. [NOTE: original comment included the table at the end of this comment.] Well USGS-42 is too distant from the ICDF to appropriately represent ground water that will flow beneath the ICDF as an up-gradient indicator of contamination. The open interval for this well is too large to accurately sample ground water near the water table where any contamination would be detected if contamination leaves the ICDF. Samples are too prone to dilution with this large open interval A minimum of one new monitoring well in the Snake River Plain Aquifer is required to serve as an upgradient well to meet the requirements of 40 CFR 264.97 (a). This well should be completed with approximately 5 ft. of screen above the water table and 20-30 ft. of screen below the water table. Well USGS-57 is completed too deep below the water table and the open interval is too large to obtain representative samples. At least one and preferably two new wells are needed immediately down-gradient of the ICDF to detect ground water contamination that may originate from the ICDF. Again the open intervals or screens should be completed approximately 5 ft. above the water table and extend 20-30 below the water table. Wells USGS-112 and –113 appear to be completed across the water table but these wells are too distant	Groundwater monitoring is an important component of the ICDF monitoring strategy and towards that, DOE has supported the installation of a tertiary monitoring system beneath the landfill (not required by regulations) as well as new RCRA-compliant monitoring wells in the SRPA. Given the fact that one of the Remedial Action Objective for the OU 3-13 ROD is to dry up the perched water bodies, it does not seem technically prudent to monitor a water body that is man-made and will not be present in the timeframe when needed. DOE requests additional written technical information, including other sites within Idaho where this is required, that provides the basis for monitoring the perched groundwater. This comment will be addressed in the 90% submittal since it includes the ICDF Groundwater Monitoring Plan.

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			from the ICDF to be useful for detecting contamination that may emanate from the ICDF. Also, the wells have too large an open interval making them subject to dilution of samples. At least two new wells are needed within approximately 500 ft. of the ICDF to obtain appropriate samples of ground water in accordance with 40 CFR 264.97(a).	

(This table is from Comment 19, second paragraph.)

Well Designation	Distance to Edge of ICDF (ft)	Distance from W.T. to top of Screen or Open Interval (ft)*	Individual or Composite Length of Screen or Open Interval (ft)
USGS-42	1,000+/-	3 below W.T.	225
USGS-57	100-200+/-	27 below W.T.	255
USGS-112	3,000+/-	20 over W.T.	134
USGS-113	3,000+/-	5 over W.T.	119

*Assumes a constant depth to the water table (W.T.) of 450 ft. beneath the ICDF (page C-7, paragraph 2) even though some wells are distant from the ICDF.

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20	App C, ICDF Groundwater Monitoring Data Quality Objectives, Attach 1, Sec 3	C-1-3	The referenced text states "In general, the near-surface geology beneath the landfill can be characterized by predominantly alluvial-deposited sand and gravel to a depth of 32 to 43 ft. Underlying the high-energy deposits of sand and gravel is a low energy "old alluvium" deposit of clay, which ranges in depth from 2 to 7 ft and mantles consolidated basalt bedrock. Significant perched saturated lenses have been identified at 110 to 150 ft below ground surface (bgs), with the major water-bearing saturated zone beginning approximately 450 ft bgs." The statement regarding the high-energy deposits points out the uncertainties associated with the location of the ICDF and its proximity to the estimated boundary of the 100-year flood plain. Therefore, care must be exercised to ensure that adequate monitoring is implemented to detect any failure of the ICDF. The second statement regarding the occurrence of perched zones emphasizes the need for determining the presence/absence of perched aquifers beneath the ICDF and for monitoring these potential perched aquifers over the long term because of variations in flow in the Big Lost River. Perched aquifer wells are needed on at least three sides of the ICDF to establish groundwater flow directions and establish a ground water monitoring network. This ground water monitoring network may need to be revised in the future based on determination of ground water flow directions.	Groundwater monitoring is an important component of the ICDF monitoring strategy and towards that, DOE has supported the installation of a tertiary monitoring system beneath the landfill (not required by regulations) as well as new RCRA-compliant monitoring wells in the SRPA. Given the fact that one of the Remedial Action Objective for the OU 3-13 ROD is to dry up the perched water bodies, it does not seem technically prudent to monitor a water body that is man-made and will not be present in the timeframe when needed. DOE requests additional written technical information, including other sites within Idaho where this is required, that provides the basis for monitoring the perched groundwater. This comment will be addressed in the 90% submittal since it includes the ICDF Groundwater Monitoring Plan.

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
21	App C, ICDF Groundwater Monitoring Data Quality Objectives, Attach 1, Sec 4	C-1-4, 1st para under section heading, 3rd sentence	The proposed vadose zone monitoring system, located beneath only a very small portion of the landfill, cannot meet the stated objective "to conclusively identify the source of any detected problems."	Comment noted. Since the vadose zone monitoring system is located beneath the area of the landfill where leachate is collected and conveyed it is monitoring the area of the landfill that has the highest leakage potential. As such, it is likely that the monitoring system will identify the source of leakage from the facility within this zone of highest leak risk. The text will be corrected to convey this concept.
22	App C, ICDF Groundwater Monitoring Data Quality Objectives, Attach 1, Sec 4.2	C-1-6	The statement regarding use of "simple conductivity" does not seem to reconcile with statements made in Sections 4.3 and 5 regarding the use of indicator parameters. Section 4.3 refers to the use of "common indicator parameters" such as "electrical conductivity, chloride, fluoride, bromide, nitrate and iodine." Section 5 refers to the use of I-129 and tritium as potential indicator parameters. It is unclear what indicator parameters the USDOE is proposing to use. Periodic sampling and analysis will be needed of the landfill leachate, pore water, perched water, and SRPA water to determine if a correlation exists between the quality of these waters and specific conductivity or any other indicator parameter for each water type. Also a good correlation must be demonstrated should an indicator parameter be used for comparison of different waters. This relationship between water quality and each water type will have to be confirmed periodically with sampling and comprehensive analyses to verify that the relationship is not changing over time as waste forms and types change.	Comment noted. The text will be clarified to indicate that indicator parameters will be initially developed from the anticipated waste profile and will be updated as the actual waste profile is developed and a leachate "signature" can be obtained from sampling at the ICDF landfill and evaporation ponds.

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
23	App C, ICDF Groundwater Monitoring Data Quality Objectives, Attach 1, Sec 5	C-1-8	The referenced text states "The proposed vadose zone monitoring plan includes the use of a tertiary LDS under the LCRS sump. Although the liner design is very conservative and already includes an integral LDS, this partial tertiary LDS would provide immediate detection of leaks through the liner system in the highest leak risk area. No soil moisture monitoring or soil pore sampling is proposed, because the results are likely to be subject to error from outside influence such as the river and percolation pond recharge perching at the old alluvium and bedrock interfaces." This limited approach is not acceptable. The vadose zone monitoring plan must include the installation and monitoring of both perched aquifer wells and the unsaturated zone beneath the ICDF. The statement quoted from the plan notes the potential influence of the Big Lost River and the percolation ponds but the plan ignores their impact. Wells are needed to determine the presence/absence of perched aquifers and to monitor the water quality of any perched aquifer over time. Additional vadose zone monitoring is needed to provide better spatial coverage beneath the ICDF since the proposal is to only monitor beneath the sump collection system which constitutes a small percentage of the overall area of the ICDF. As stated above, this should include perched water monitoring. In addition, suction lysimeters are needed in a statistically appropriate scheme to provide detection monitoring beneath the ICDF.	Disagree with the comment. The intent of monitoring the vadose zone beneath the landfill is to determine potential leakage from the cell within a time-frame that can be corrected or remediated prior to the leakage reaching perched water zones or the SRPA. We do not see the benefit to monitor a temporary perched water zone over 100 feet below the landfill as a basis for corrective action for the facility if landfill leak detection systems are functioning properly, and the time frame for percolating water to reach the perched zone extends beyond the operating life of the facility. If perched water wells are required by the Agencies for leak detection monitoring for the ICDF, then there is no need for additional vadose zone monitoring using the tertiary system shown, or additional suction lysimeters requested beneath the cell.

DOCUMENT TITLE: Draft 60 Percent Design, EDF-ER-311, Screening Level Ecological Risk Assessment

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
24	General	General	a) The failure to take cumulative effects of COPC into account is a major source of uncertainty, leading to the likely underestimation of risk. It is not possible to evaluate the potential interactions of a large number of contaminants, but it must be acknowledged that cumulative impacts are likely. Even exposure to lower levels of the COPC that were screened is likely to tax metabolic detoxification pathways such that organisms will be somewhat compromised and less able to tolerate the total burden of chemicals to which they will be exposed. b) Many radionuclides were screened out of the assessment. The remaining nuclides are assessed individually. It would appear that the most important consideration in the risk assessment is the total internal and external dose received by receptors from exposure to all radionuclides. If this cannot be determined, then a significant area of uncertainty and likely risk underestimation must be acknowledged in the document. c) The evaporation pond is likely to be used as a significant resource by migratory birds, including waterfowl. Receptors such as ducks would be expected to have considerable exposure to COPC in water and sediment. The risk assessment has not adequately characterized risk to these receptors.	a) Cumulative affect will be analyzed in the revised 60% document. b) This comment was discussed on 11/16/01. The cumulative effect from all radionuclides will be addressed in the revised 60% document. c) Affect on ducks has been analyzed and has been added to the revised 60% document. Low residence times (1.1 days for ducks) is mentioned and will not lead to considerable exposure for waterfowl. The discussion of residence time for waterfowl and the Townsends big ear bat have been expanded in the document.
25	Sec 1.1.2.4	21, para 1, 1st sentence	It is stated that Table 5 lists fauna potentially present near or within the assessment area. Table 5 lists species of special concern, however. Please clarify.	Clarification will be added to text. No species of concern or T/E are present in the assessment area.

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
26	Sec 1.1.3	26, para 1, 2nd sentence	a) Surface soil pathways will not be evaluated because surface soil will be buried beneath two feet of gravel. Please provide information regarding the assumed time interval between placement of contaminated soil in the landfill and covering with gravel. b) Also, please explain the statement that the surface water pathway will not be analyzed. The meaning of the statement is not clear, as water ingestion by ecological receptors is included in the analysis.	a) In talks with the project it will be almost immediate. The are will be highly disturbed and the likelihood of receptors staying in these areas is highly unlikely. b) Surface water pathways are evaluated but further clarification to the text will be added.
27	Sec 2.1.2	37, para 3, 2nd sentence	The reference to Equation 6 should be to Equation 5. Please correct.	Correction will be made.
28	Sec 2.3.6	44, para 3	This paragraph is essentially a duplicate of the paragraph comprising Section 2.4.4, in which the uncertainty associated with PUFs and BAFs is discussed. This uncertainty discussion does not need to appear in both sections.	Section will be removed.
29	Sec 3	50, para 3, 1st sentence	The term COPC has been used consistently in INEEL risk assessments to describe both radiological and nonradiological contaminants. In ecological risk assessment, the term ROPC has frequently been used to describe receptors of potential concern. For these reasons, it would be less confusing to list the two different classes of contaminants as radiological and nonradiological COPC.	Change will be made.

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30	Sec 3.1.1	50, para 3, 1st sentence	The term "BDAC" should be defined. It does not appear to be defined in this section or in the acronym list.	Term will be defined.
31	Sec 3.1.1.4	54, para 1	The IDEQ is not familiar with the proposed DOE guidance *"A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota."* The text indicates that it "it is approved by EH-4 for interim use by DOE program and field elements in evaluating doses to biota." However, the proposed use of this approach for the ICDF remedial action SLERA requires review and concurrence of the IDEQ and USEPA. Therefore, please provide a copy of the referenced draft document for our review. Until the methodology is reviewed, it will not be possible for the IDEQ to approve its application in this SLERA.	Document will be provided with the document submittal.
32	Sec 3.1.1.4, Table 14	54,	Activity concentrations of radionuclides in INEEL risk assessments have generally been measured and presented in units of picocuries. This table has units of both becquerels and picocuries. It is recommended that one system be used consistently in the document; at the least the two types of units should not be mixed in the same table. If SI units such as becquerels are required for some reason, then the value in the other units should be presented in parentheses.	Conversion will be made.
33	Sec 4.4	73, para 5, 3rd sentence	It is stated that radionuclide TRVs are based on effects on populations, and are thus less conservative than nonradionuclide TRVs, which are based on effects on individuals. This is particularly true for species of special concern, in which the focus is risk at the individual level. It is likely, then , that the use of	While this statement is true, no T/E species are present in the assessment area (clarification of the matter will be made in the document).

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			radionuclide TRVs will result in underestimation of risk to T/E species and other species of special concern.	
34	Sec 4.4, Table 18	74	This table should acknowledge the unavailability of toxicity information for a large number of COPC as a significant area of uncertainty in the risk assessment.	It will be noted in the uncertainty section.

DOCUMENT TITLE: Draft 60 Percent Design, Waste Acceptance Criteria for ICDF Landfill, DOE/ID-10865

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
35	Sec 1, Figure 1-1	1-2	a) The ICDF is incorrectly located in this figure (i.e., portrayed to be northeast of the INTEC). Please correct. b} A legend, or at least an arrow, should be used to identify the dashed area as the AOC. c) It is unclear why the permanent stockpile is depicted as the AOC in the enlargement. Please clarify the intent.	a) Accept comment. Map has been corrected in revised 60% document. b) An arrow will be added. c) Clarification will be made in 60%.
36	Sec 4.1.1, Table 4-1	4-1	The IDEQ cannot concur with the statements in the Summary of Results column for the Liner/Leachate Compatibility Study. These statements indicate that "*organic constituents would have to be present at 0concentrations several orders of magnitude higher than the Design Basis Inventory organic constituents before they could be considered a problem for liner compatibility.*" This is inconsistent with the IDEQ's review of information included in the Liner/Leachate Compatibility Study provided in the 30 percent Remedial Design. As stated in the IDEQ's May 25, 2001 comments on the 30 percent Design (Comment 111 a), all organic contaminants were screened out of the Liner/Leachate Compatibility Study. There were no limits of organic contaminants identified that could be accepted into the landfill without adverse effects on the liner system. The USDOE's response to the IDEQ's comments states that "*All constituents identified in future versions of the WAC will be included in this EDF and specific WAC limitations will be developed for these constituents.*" The IDEQ cannot concur with information that has not yet been provided for review.	It is understood that IDEQ cannot concur with information that has not been provided. This is only a 60% design document, with actual concurrence to be provided at the 90% submittal.

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
37	Sec 4.1.3	4-2, 1st para under section heading	Please see Comment #36 regarding conclusions drawn from the Liner/Leachate Compatibility Study (DOE/ID EDF-ER-278).	It is understood that IDEQ cannot concur with information that has not been provided. This is only a 60% design document, with actual concurrence to be provided at the 90% submittal.
38	Sec 4.1.3	4-2, 2nd para under section heading	As stated in the IDEQ's May 25, 2001 comments on the 30 percent Design (Comment # 156), the criteria that will be used by the ICDF Management on a case-by-case basis to determine chemical equivalency through a paper study must be identified in the design documents. Note that these criteria must receive Agency concurrence. If sufficient detail regarding these cannot be put into the Group 3 RD/RA documents because site specific waste forms are unknown at this time, then either EPA Method 9090 will be required to demonstrate compatibility or Agency concurrence on the paper study must be sought on a case-by-case basis when each situation arises.	Clarification was received on 11/5/01; comment will be addressed in the 90% submittal.
39	Sec 4.1.4	4-2	The text makes reference to a document, which has not yet been submitted, for Agency review. No concurrence regarding information to be presented in this document can be given at this time.	The referenced document has been submitted to the agencies in the SSSTF RD/RA package.
40	Sec 4.2.1, Table 4-2	4-5	The $1X10^{-4}$ risk based concentration for I-129 appears to be in error. The out-dated risk based tables created by Jeff Fromm (IDEQ, January 3, 1996) show a $1X10^{-6}$ risk concentration of $2.6X10^{-1}$ pCi/l which equates to a $1X10^{-4}$ risk concentration of $2.6X10^{1}$ pCi/l. The $1X10^{-4}$ risk based concentration presented in this table is 2.67 pCi/l which is an order of magnitude smaller. Small changes are expected in new risk based concentrations following the new EPA approach. The half-life for I-129	Clarification was received on 11/5/01; comment will be addressed in the 90% submittal .

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			should not be a factor in this table so the values should match closer than is evident. Tc-99 risk based concentrations in this table, when compared to Fromm (January 3, 1996), appear to be off by 2 orders of magnitude although similar in value when the order of magnitude is ignored. The half-life for Tc-99 should not be a significant factor in this table so the values should match closer than is evident.	
41	Sec 4.2.1, Figure 4-1	4-7	A "*yes*" is missing under decision/evaluation #3.	A yes will be added.
42	Sec 5.2.2.1	5-3, 1st para, 6th sentence	The 6th sentence appears to contain an incorrect acronym of "UST" ("...the constituent must be present below the applicable LDR and UST levels.."). Please clarify if this refers to UTS (Universal Treatment Standard).	Typo will be corrected.
43	Sec 5.2.2.1, Table 5-2	5-4	a) Please clarify how the Maximum Design Recharge Rate was determined. b) Also, clarify what form of cyanide (total, weak and dissociable, etc.) is applicable for the 8.2E-02 mg/kg level in waste soil.	The MDR was calculated in the Leachate Reduction study. b) A clarification will be made.
44	Sec 5.2.3	5-9	Since the WAG-3 Remedial Action is responsible for ensuring that the stabilized waste form meets the 50 psi standard and does not compromise the long term effectiveness of the cover, the ICDF management should identify and provide guidelines to the "generator" regarding the selection and use of stabilization agents.	Comment clarified on 11/5/01. The requirements will be in the 90% WAC submittal.

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45	Sec 5.2.7, Table 5-4	5-10	Steel boxes: The text states that the steel boxes are assumed to be completely filled and, therefore, uncompressible. Very few cleanup projects have just enough waste to fill every box to the top, and/or box contents may settle significantly during transport. This is a concern because the proposed waste verification step at receipt does not include opening containers. Yet, the very next sentence indicates boxes with greater than 5% void space will not be accepted. Please explain, in the text, how this criterion can be met without visual verification. It is the responsibility of the ICDF management to verify these aspects of the waste profile.	This comment was clarified on 11/5/01. The response will be made in the 90 % submittal.
46	Sec 5.4.6	5-22, 3rd and 4th bullets	The IDEQ agrees that these two criteria are important to ensure that the cover is not compromised. However, the procedures and activities outlined within this WAC (and the related ICDF complex and SSSTF WACs) do not ensure that these criteria will be met. Please see Comment #45.	Comment clarified on 11/5/01 and will be addressed in the 90% submittal.
47	Sec 5.3, Table 5-5	5-11 thru 5-20	Presentation of the restrictions on the radionuclide activity that can be placed in the ICDF landfill is confusing and requires clarification. The IDEQ received the complete 60 percent submittal and began our review on August 31, 2001. On September 4, 2001 the IDEQ received a "*revised ICDF Landfill Waste Acceptance Criteria*" from Mark Nielsen of CH2MHILL. The transmittal memorandum indicates that CH2M HILL found "mistakes in the ICDF WAC for the Landfill version" the Agencies received on August 31, and requests that we "replace that version with the new version attached to this letter." The table 5-5 provided in the September 4 version is formatted differently than the table provided in the August 31	This table was discussed with the Agencies on November 13, 2001. A revised version with additional clarification will be provided in the 90% submittal.

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			original submittal. The September 4 version of Table 5-5 is confusing in that little or no explanation of column calculations is provided, and units are not consistent. In addition, the utility of including short lived species such as Ba-136m with a half-life of 9.77 E-9 years (0.3 seconds) is questionable. The IDEQ asked for clarification of this table on a September 24 conference call. In response, Mark Nielsen stated that the September 4 version of the table contains apportioning errors, which would result in some changes to the calculated RBC and RAO values; he indicated that some values would change by roughly two orders of magnitude. To correct the errors in this table and to provide additional explanation of calculations, USDOE transmitted another version of the table electronically on September 27. This table was expanded significantly from the September 4 version (i.e., the September 27 version consists of over 40 columns versus 15 columns in the September 4 version). The transmittal note indicates that the September 27 version is intended to be part of the ICDF 90 percent Design submittal, and that USDOE only expects this review cycle to include comments on the portion of the spreadsheet that was included with the 60 percent submittal. Correlation between the September 4 and September 27 versions of the table is very difficult because some of the column titles have changed. The IDEQ has used the "cross-walk" guide included in the transmittal e-mail for the September 27 version to attempt to correlate this table with the September 4 version. However, it is not readily apparent exactly which values changed between the September 4 and September 27 versions. Further explanation of these changes is needed. Additionally,	

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			the derivation methodology of some of the columns remains unclear, despite the explanations provided in the September 27 file entitled "*Derivation of RAO-based Concentration . . .*" Finally, the IDEQ expected that the table would include a column presenting an acceptable Curie concentration/contaminant. However, this derivation does not appear to be provided. During comment resolution, the Agencies need to carefully discuss and reach consensus on the contents/derivation methodologies of those portions of Table 5-5 that are included, or need to be included, in the remedial design.	
48	App B, Table B-1	B-3 thru B-7	The text should provide explanation of the derivation of the *"Dose Equivalent curie Correction Factor."* It is obviously normalized to PU-239/240, but further explanation on how this was done is necessary.	The use of Appendix B dose equivalent curie correction has been deleted from the document in the 90% design.

DOCUMENT TITLE: Draft 60 Percent Design, Waste Acceptance Criteria for ICDF Evaporation Pond, DOE/ID-10866

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
49	Acronyms	ix – x	Please add RAO and RBC to the list.	Comment accepted, will include.
50	Nomenclature	xi – xii	The IDEQ recommends that "*PCB waste*" be defined because the text, as written, is confusing. The ICDF landfill will accept PCB waste, and the landfill leachate will be discharged to the evaporation pond. However, Section 5.1.2 of this WAC indicates that PCB waste is prohibited from the pond. The document needs to provide cl0arification on this item.	PCB waste will be identified. Also a clarification will be made in the 60 % that this means no direct disposal of PCB waste, however F039 waste may have a PCB component.
51	Sec 1.2.1	1-3, 1st bulle t, last sentence	This sentence is not accurate. Treatment for TSS will be provided to these wastewaters prior to being disposed in the evaporation pond. Please modify the sentence.	A TSS limit will be included in the 90% submittal.
52	Sec 1.2.1	1-3, 2nd bulle t last sentence	Please identify where the "*design basis inventory*" is located in the document for the evaporation pond. This was not included in ICDF Design Inventory presented in the 30 Percent Design (EDF-ER-264). Without having reviewed this information, we cannot concur with the assertion that all of the waste in the current design basis inventory can be accepted into the ICDF evaporation pond without treatment.	We agree that the inventory for the liquid wastes is not in EDF-264. This information will be provided in the 90% RD/RA work plan. It is also understood that IDEQ cannot concur with information that has not been provided. This is only a 60% design document, with actual concurrence to be provided at the 90%.
53	Sec 1.2.1	1-3, last bullet	Well development water should be treated to reduce the TSS prior to discharge to the evaporation pond.	A TSS limit will be added to the 90% submittal.
54	Sec 1.4.2	1-5, last bullet	Please see Comment #36 regarding conclusions drawn from the Liner/Leachate Compatibility Study (DOE/ID EDF-ER-278).	It is understood that IDEQ cannot concur with information that has not been provided. This is only a 60% design document, with actual concurrence to be provided at the 90% submittal.
55	Sec 1.5	1-6, addition al issue	Vehicles (tankers, flatbeds with portable tanks, etc.) will require flushing/rinsing of aqueous or silty residues. Please indicate the responsible entity for this procedure.	This is not a WAC issue. It is a procedural issue and will be addressed in the 90% submittal.

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
		to be addressed	Also, the text should describe where and how this will be accomplished.	
56	Sec 1.5.1	1-6, list of bullets	Please add an additional bullet indicating management of all off-loading events to the evaporation pond for aqueous wastes that are generated outside of the ICDF Complex.	A bullet will be added.
57	Sec 2	2-1	Please clarify if the Waste Profile form for the ICDF landfill is the same Profile form used for the ICDF Complex, and provide a copy of this form as an attachment.	The ICDF Complex WAC is the governing WAC for entrance into the ICDF Complex. The waste profile procedure is outlined in the ICDF Complex WAC document and referenced in this document. The waste profile is the same for any entity within the ICDF Complex.
58	Sec 2.2, Table 2-1	2-1	a) Please see Comment #64 for additional restrictions on the types of aqueous wastes accepted for discharge to the evaporation ponds. b) CERCLA-generated well purge/development water: These wastes must also meet the TSS physical criteria.	Any waste meeting the WAC may enter the pond. There is no technical reason to eliminate these waste streams. A TSS requirement will be added to the 90 % WAC.
59	Sec 3.5.1	3-3, last sentence	As stated in the IDEQ May 25, 2001 comments on the 30 percent Design (Comment # 157), some sampling of leachate and other waste streams that will be sent to the pond is necessary to ensure compliance with 40 CFR 264.552 (c) (2) and 40 CFR 264.552 (c) (4). The text states that "*the ICDF management may elect to track the concentrations of key indicator parameters contained in the leachate, as measured in the evaporation pond.* This proposed approach is insufficient. First, the need to sample the waste streams that discharge to the evaporation pond is ARAR-driven and is not at the discretion of the ICDF management. Secondly, the waste streams must be sampled prior to	Comment clarified on 11/5/01 and will be addressed in the 90% submittal.

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			discharge into the pond in order to determine whether use of the pond will remain protective, not after the waste has been diluted in the pond. Thirdly, as stated in the previous comment, the Agencies need to determine the required analyte list and sampling frequencies to address these ARARs; at this time, the IDEQ does not concur that sampling will include only "*key indicator parameters.*"	
60	Sec 3.5.2	3-3, 2nd sentence	The logic behind the referenced sentence is unclear. Regarding non-leachate aqueous wastes, the text states that, "*individual discharges of aqueous waste to the ICDF evaporation pond must be accompanied by a waste profile sheet, but separate analytical data are not required for each discharge of water from the same source because the waste generating the water is the same as the waste generating the landfill leachate.*" The IDEQ agrees that if analytical data exists for a particular waste stream, and if the factors that could affect the water quality have not changed, then separate analytical data would not be required for each discharge. For example, in the case of purge water from a given well, if there have been no changes in sample collection techniques such as depth of pump or flow rate, then previous analytical data may be sufficient to characterize the waste stream. However, the IDEQ disagrees with the last portion of the referenced statement indicating that the waste generating the water is the same as the waste generating the landfill leachate. This logic is unclear, and not necessarily valid. The source of non-leachate liquid wastes discharged to the evaporation pond may or may not derive from a source material disposed in the ICDF landfill. This is particularly true with respect to purge/development	The sentence will be revised in the 60% submittal. The end of the sentence beginning with because will be deleted.

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			water. Please modify the text accordingly.	
61	Sec 3.12.2	3-4	Please also include the aqueous wastewaters currently in storage within the SSA facility.	Comment accepted. Language has been added to clarify that the SSA Waste is included. This will be added in the 90% RD/RA Work Plan.
62	Sec 4.1.3	4-2, 1st para	Please see Comment #36 regarding conclusions drawn from the Liner/Leachate Compatibility Study (DOE/ID EDF ER 278) presented in the 30 percent Design. This paragraph also refers to liner compatibility concentrations for organics that have not yet been provided to the agencies. The IDEQ cannot concur with information that has not yet been provided for review.	It is understood that IDEQ cannot concur with information that has not been provided. This is only a 60% design document, with actual concurrence to be provided at the 90% submittal.
63	Sec 4.1.4.1	4-2	Please discuss how and when the CAMU Closure and Post-Closure plans for the evaporation pond will be developed per 40 CFR 264.552 (e) (4).	The CAMU closure plans will be addressed in the 90% submittal. Closure requirements are not a WAC issue.
64	Sec 4.1.4.1	4-2, 2nd para under section heading, 2nd sentence	We disagree with the assertion that any "*CERCLA-generated aqueous waste from within the INEEL that meets the evaporation pond WAC can be accepted into the evaporation pond without further treatment.*" As stated in paragraph 1, the ROD specified that the evaporation pond will be designed and constructed to treat ICDF leachate and other aqueous wastes generated during operations of the ICDF complex. Decontamination water is an example of an aqueous waste that could be generated during operations of the ICDF complex, and could therefore go to the evaporation pond. The ROD also identified purge and pumping test waters from Group 5 as candidates for discharge to the evaporation pond. However, CERCLA aqueous wastes that are not generated as part of the operation of the ICDF complex are not eligible for discharge to the evaporation pond. This includes as-generated wastes from process waste tanks and/or	a) The OU-3-13 ROD limits the waste that can be accepted into the Evaporation Pond regarding the CAMU status. It does not, nor is there any technical reason to limit waste from within the INEEL boundaries that meets the Waste Acceptance Criteria. The risk assessments done for the EP show that there is not a risk to human health or the environment as long as the WAC has been met. b) DOE has agreed to a waste approval process to allow the Agencies to review the waste streams entering the ICDF Complex. This will allow for concurrence that a waste stream meets the WAC and therefore is acceptable on a technical basis. c) DOE-ID requests further clarification on the State's position that INEEL CERCLA-generated waste that

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			wastes generated as a result of implementing remedial actions on process waste tanks. These wastes are not eligible for discharge to the evaporation ponds, regardless of whether their contaminant concentrations meet the evaporation pond WAC. Additionally, these other CERCLA aqueous wastes would likely meet the ICDF WAC following treatment and, once treated, would not occupy a significant volume of space in the landfill.	meets the Agency-approved WAC cannot be sent to the pond.
65	Sec 4.2	4-4, 1st para under section heading	As discussed on the September 24, 2001 tri-agency conference call regarding the risk assessment, the site visitor who spends one day per year at the ICDF fence line may not be the most conservative public exposure. For example, a resident of Atomic City who commutes to Arco daily may be subject to a larger exposure over time. Also, consideration should be given to any delivery personnel and/or volunteers at EBR-1 who may receive a larger dose than the proposed scenario.	This is not a WAC issue and will be addressed in the 90% Short Term Risk Assessment (EDF-ER-327). The sentence will be deleted from the text.

DOCUMENT TITLE: Draft 60 Percent Design, EDF-279, Hydrologic Modeling of Final Cover

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66	Sec 2	2-1	Based on the hydrologic model geometry presented in Figure 2-1, the IDEQ does not agree with the location of observation points chosen for subsequent analysis in the report. In particular, the location of points D and F seem inappropriate. Based on our current understanding of the diversion capability of sloped, capillary barriers the most likely point at which there would be significant breakthrough would be downslope of the crest of the cover rather than at the midpoint. At such downslope locations, infiltration is augmented by runoff on the cover. Likewise maximum flux would not occur at point F but somewhere downslope. A 2-dimensional analysis is needed as described in Comment #68.	We understand the comment to have three parts: The cover was modeled at a point verses over its area. Accumulation of water in downslope locations due to lateral diversion within the storage layer will increase infiltration. Accumulation of surface runoff in downslope locations may increase infiltration. Based on this understanding our responses are provided below: Point D shown on Figure 2-1 represents the breakthrough in units of mm/year over the entire cover area and not at a particular point. This will be clarified in the revised 60% submittal. 2-D modeling studies and field tests have been performed (Zhan, G., Mayer, A.B. etal., 2001, Morris and Stormont, 2000, and Stormont, 1996) to evaluate the lateral movement of moisture in sloping evpotransporation (ET) cover systems. The modeling and field tests show a trend in increasing breakthrough in the down-slope direction when the cover is near saturated conditions. There is little increase in the down-slope condition when the moisture content is below saturation. The ICDF landfill cover water storage layer as been designed to store large volumes of water based on long-term base case and extreme climate conditions. Consequently, the frequency of reaching near saturated conditions and breakthrough will be small minimizing down-slope effects. Very little run-off (less than 1% of the average annual precipitation) has been simulated in the model. Daily

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				precipitation amounts were distributed in the model over a 12-hour period. The time for surface flow to travel from the apex of the cover to the downslope end is short (i.e., less than 30 minutes) minimizing the contact time with the cover. For these reasons, infiltration into the cover was maximized and downslope accumulation of run-off water will be minimal. Please see the response to comment number 72 with regard to the 2-D analysis. References Cited: Stormont, J.C., 1996, "The Effectiveness of Two Capillary Barriers on a 10% Slope", Geotechnical and Geological Engineering, Vol 14, pp. 243-267. Morris, C.E., Stormont, J.C., 2000, "Incorporating Near-Surface Processes in Modeling Moisture", ASCE Special Publication, Advances in Unsaturated Geotechnics, ASCE, 2000. Zhan, G., Mayer, A.B., McMullen, J., Aubertin, M., 2001, " Slope Effect Study on the Capillary Cover Design for a Spent Leach Pad", Tailings and Mine Waste '01 Proceedings, Balkema, Rotterdam.
67	Sec 3.1, Figure 3-1	3-1	The ordinate axis has units of “inches” in this figure. It is assumed that these units should be “millimeters” to match the text discussion. Please clarify.	The ordinate axes label is incorrect. The units should be "millimeters" as discusses in the text. The label will be corrected in the revised 60% submittal.
68	Sec 4.2	4-2	The method of analysis used to estimate breakthrough in the upper cover section is not truly a 2-dimensional analysis. The use of the SoilCover model, a 1-dimensional model, does not take into account the sloping nature of the capillary barrier and, as a consequence, the true flux (or its location) which would	Please see the response to comment number 66. We will evaluate using the suggested analytical analysis for verifying the model results and include it in the 90% submittal.

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occur upon breakthrough. The average annual flux shown in Table 4-1 and assigned to point D in Figure 2-1 is not conservative for any of the precipitation scenarios.

The 2-dimensional analysis (model) should be combined with an analytical analysis for verification. Such an examination is described in Selker, et al. ***Vadose Zone Processes***, Chapter 3. Please provide this analytical solution.

The IDEQ used the approach described in Selker, et al. ***Vadose Zone Processes***, Chapter 3, noted above, to estimate the vertical flux that would be required to cause breakthrough from the silty loam soil at a distance of 100 meters from the axis of the cover. A value of 100 meters was selected that is less than the side slope length of 122 meters. The internal slope of the capillary barrier is assumed to be 1.718°, the same as the final cover slope. Saturated hydraulic conductivity is assumed to be $5X10^{-4}$ cm/sec. The air entry pressure is assumed equal to "a" for the silty loam soil (page C-32) which is 15.84 kPa or 0.1615 m – head of water.

$q = |h_{ae1}| (k_{s1})(\tan\Phi)/L$

$q = 0.76$ cm/yr = 7.6 mm/yr

This calculation supports the model prediction that breakthrough would occur at greater than three times recorded precipitation. We request that a similar calculation be performed by DOE and included in the 90% design. The question remains as to whether the predictions are conservative for the long term, both the 1,000 year design life of the facility and with respect to the half lives of contaminants that will be placed in the

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			facility. Reference Cited: Selker, John S., C. K. Keller and J. T. McChord, 1999; Lewis Publishers (CRC Press LLC), 339 p.	
69	Sec 4.2	4-2, para 2	This paragraph states that "The SoilCover™ 2000 computer program approximates run-off using a method that includes a small inherent error." Provide a quantified limit on this error.	This method has some small error because the runoff depends on the darcy flux between the two points that are just below the soil surface, not at the surface. However, runoff was determined by the SCS curve number method and not by the SoilCover computer model. Therefore, the runoff function of the SoilCover model was not used in the 60 percent hydrologic model.
70	Sec 4.3	4-3	The analysis of infiltration due to biological intrusion is confusing. How is it determined that the area drained by the burrow is 10 times the diameter of the burrow? Please show the derivation of the equation given for calculating this area and, if possible, relate this to some schematic drawing of the relationship that is being calculated.	The drainage area of the burrow was based on the agreement made between BBWI and the regulatory agencies during the June 18, 2001 meeting in Boise, Idaho. The area drained by the burrow is the equation for the area of a circle (i.e. $\Pi d^2/4$). We will include a schematic in the revised 60% submittal to clarifies the defect analysis.
71	Sec 4.3	4-3	The analysis of lateral drainage in this section only addresses the capacity of the lateral drainage layer to conduct water under saturated conditions. It does not take into account and address movement and infiltration of water through this layer and into the underlying material (potentially a degraded CCL) under unsaturated conditions, which may be the most likely scenario.	The movement of water into the underlying CCL is addressed in section 4.5 - Percolation at the Base of Cover. Additionally, we will use a 2-D model to simulate the unsaturated flow in the lateral drainage and CCL barrier layer as described in the response to comment number 72.
72	Sec 4.5	4-5	Research on the correlation of percolation to infiltration reported in one paper, not provided to the IDEQ and based on hydrologic simulations using the HELP model, are used to reduce the percolation through the cover essentially by a factor of 5X. The application of a screening model analysis to numerical simulations	The SoilCover model accurately simulates water movement in the upper portion of the cover. This model developed for the ICDF landfill cover has been through numerous and extensive reviews by experts in the field of unsaturated flow. Moreover, the results are consistent with results from other studies of comparable cover systems including actual

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			involving extremely small fluxes is not reasonable. The IDEQ cannot accept this significant reduction on this basis and without additional documentation. As in other comments above, the IDEQ believes that 2-dimensional modeling of the complete geometry of the cover system should be completed to more accurately represent the movement of water through the system. This is preferred to relying on a series of less than adequate evaluations to address the multi-dimensional aspects of the cover.	test plots at INEEL. The SoilCover model presented in the 30 percent hydrologic model demonstrated that the upper and middle cover sections alone were effective in reducing the infiltration to less than 0.0005 meters average annual infiltration per year under very conservative long term climate assumptions (90 percentile rain events back-to-back). Additionally, the model assumed a flat cover (no runoff), short 22-day snowmelt season, and poor vegetation, all to simulate extreme conservative conditions. In the 60 percent hydrologic model, more conservative cover conditions were added to the model such as holes in the cover left by burrowing animals and clogging effects of the lateral drainage layers adding 0.00001 meters average annual infiltration per year through the upper and middle cover sections. Runoff from the sloping cover surface and lateral drainage were evaluated in the 60 percent hydrologic model to quantify the benefits of the 2-dimensional attributes of the cover system. Again, using conservative assumptions, runoff accounted for less than 1 percent of the total average annual precipitation. Lateral drainage can accumulate more than 1,000 times the volume of water that could breakthrough the upper portion of the cover. These attributes provide redundancy and other mechanisms to remove water from the cover system, however, did not significantly change the original infiltration rate of less than 0.0005 meters average annual infiltration breakthrough through the upper portion of the cover. Percolation through the compacted clay barrier layer located 15 feet below the surface of the cover was evaluated using the results from studies performed by Peton and

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				Shroeder (HELP Model developers). Again, conservatively assuming that infiltration breakthrough from the upper portion of the cover would actually reach the compacted clay layer, 20 percent of total breakthrough (0.0001 m/yr) would percolate through the base of the clay barrier. We will use a 2-D unsaturated flow model to simulate the movement of moisture between the lateral drainage layer and compacted clay liner barrier to verify the annual percolation flux of 0.0001 m/year from the base of the clay barrier. The inflow for the 2-D model will be based on the breakthrough flux from the bottom of the water storage layer reported in the 60% submittal. This 2-D analysis will be included in the 90% design submittal.
73	Sec 4.5	4-2, para 2	The use of non-site-specific HELP model simulations to determine that 20% of the available water will infiltrate the CCL is less desirable than doing site specific calculations or modeling to predict the amount of infiltration that could occur. Please replace this section with site specific analyses rather than the approach presented.	We will use a site specific 2-D unsaturated flow model to simulate the movement of moisture between the lateral drainage layer and compacted clay liner barrier to verify the annual percolation flux of 0.0001 m/year from the base of the clay barrier. The inflow for the 2-D model will be based on the breakthrough flux from the bottom of the water storage layer reported in the 60% submittal. This 2-D analysis will be included in the 90% design submittal..
74	Sec 5.2	5-2, para 1	**a)** Please clarify the last sentence which states "The resulting infiltration at Point D is 0.17 mm/yr, which is less than the actual infiltration 0.49 mm/yr determined in Section 4.2." Neither value appears in Section 4.2 so it is not clear what is being stated.	The actual infiltration of 0.49 mm/yr. should be 0.46 mm/year. The infiltration was determined to be 0.17 mm/yr. based on three times the average annual. The value is provided in Appendix E of the EDF. The text will be clarified in the revised 60% submittal.
			b) In addition, this is a comparison of modeled values and none of the values should be characterized as "actual infiltration" as used in the document. This section requires modification to clearly state intent.	Comment noted. Text will be revised.

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75	Sec 6	6-2, para 1	**a)** Please see Comment #74 regarding the sixth sentence. **b)** The paragraph also states "*Precipitation of four times the average annual precipitation saturates the water storage layer rendering it ineffective for reducing infiltration.*" Appendix E, Figure E-2, on page E-3 illustrates the resulting infiltration rates through the silt loam layer with increasing precipitation. Infiltration is depicted as increasing linearly between three and four times the "*1975 recorded precipitation*". In other words, infiltration is predicted to increase when precipitation exceeds three times the 1975 recorded value. This was a simplistic sensitivity approach toward assessing the potential impact of climate changes in that only the amount of precipitation was changed and other climatic factors were not changed. The margin of safety associated with this design is not conservative since other appropriate climatic changes are not considered that would be anticipated with a higher precipitation environment such as cooler temperatures and less solar input. The quoted phrase should be re-stated to note the cover becomes ineffective at adequately reducing infiltration to about three times the average annual precipitation using even a simplistic precipitation scenario.	The text will be revised to clarify that the purpose of the sensitivity analysis is to vary one parameter (i.e., precipitation) while keeping the other parameters constant. Further clarification will be added as suggested to indicate that the cover is ineffective at about three times the average annual precipitation if that the other parameters remain constant. These clarifications will be included in the revised 60% submittal.
76	App E, Sec 2		The results of the precipitation sensitivity analysis, showing a decrease in infiltration from the 2X to the 3X simulations due to increased transpiration, illustrate the impact of factors other than precipitation on resultant infiltration. The intent of the sensitivity analysis from the perspective of the IDEQ is to evaluate long-term climate change scenarios. The omission of other	At the June 18, 2001 meeting, it was discussed that infiltration was most sensitive to increases in precipitation. Additionally, it was discussed that three times a sensitivity analysis would be performed to determine the performance of the cover with respect to precipitation and provide an upper bound to amount of precipitation that would cause the ET portion of the cover to fail. The sensitivity analysis

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
			climatic variables that could likely accompany increased precipitation in a future climate change scenario and thereby influence vegetative growth and the net infiltration of precipitation limits the utility of the analysis.	shows a distinct breaking point at 3X the average annual precipitation when the cover can no longer store and release moisture and is thereby ineffective in reducing infiltration. The cover's performance is less sensitive to varying other parameters. For example, the performance of the cover is less sensitive to vegetative growth. A parametric study for evaporative cover systems was performed by Wojciech Winkler for a MS Thesis at the University of Wisconsin in December 1999. The parametric study concluded that varying vegetation characteristics of the vegetation such as percent bare area, leaf area index and root density function, have a small effect on the infiltration through a ET cover system.

DOCUMENT TITLE: Draft 60 Percent Design, Fate and Transport Modeling Results and Summary Report, EDF-ER-275

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
77	General	General	**a)** The modeling efforts predict the need to limit infiltration to 0.0001 m/yr to avoid contaminating the aquifer to unacceptable levels. This infiltration rate must be maintained beyond the life of the ICDF because of the long half-lives of the key radionuclides of concern. It is a serious concern that an infiltration rate of 0.0001 m/yr is used to justify acceptable waste concentrations for the ICDF. This low infiltration rate requires acceptance of some key assumptions given the predicted peak arrival time of the I-129 in the aquifer is in excess of 10,000 years. It requires acceptance of the ability of the cap to reduce infiltration to 0.0001 m/yr, acceptance that the cap can continue to reduce infiltration to 0.0001 m/yr for thousands of years, and acceptance that the precipitation rate will not increase over three times the 1975 recorded precipitation. The sensitivity runs indicate failure of the cover when precipitation exceeds three times the 1975 recorded precipitation. It is not unreasonable to assume that precipitation could increase significantly in the intervening years and if the cap has degraded, allow a much higher infiltration rate through the ICDF than predicted with a fully functional cap. The key radionuclides of concern that are most likely to pose a future risk in the aquifer are I-129 and Tc-99. I-129 has a half life of 15,700,000 years and Tc-99 has a half life of 213,000 years. The design life of the ICDF is 1,000 years, which are two orders of magnitude less than the half life for Tc-99 and four orders of magnitude	Details on materials and design features that are incorporated into the landfill that ensure protection of the cover are described in the 90% Liner and Final Cover Long-Term Performance Evaluation and Final Cover Life Cycle Expectation. A summary of these features are provided below: **Large Diameter Sideslope Rock Armor:** The cover will be armored on its sideslopes with large (up to 2 foot diameter rock) basalt riprap sized to prevent water and wind erosion from eroding the sides of the cover. The riprap was sized to prevent erosion due to the probable maximum precipitation event (i.e., 1 in 1,000 year event) using NRC design criteria for long-term stabilization. **Soil/Gravel Surface Mulch:** Wind tunnel studies have demonstrated that the soil and pea sized gravel mulch protecting the cover surface is resistant to sustained wind speeds of above 60 mph. The average wind speed at INEEL is 9 mph. **Overbuilt Cover Thickness:** The cover includes an extra 4 feet (45% increase in thickness) of soil that if eroded would continue to reduce infiltration to 0.0001 m/year. **Biointrusion Rock Armor:** Extensive studies at INEEL demonstrate that the biointrusion rock in the cover will prevent insects and animals from penetrating the cover. Additionally, defects left in the upper portion of the cover (above the biointrusion layer) by animals have been accounted for in the cover design. **Earthen Materials:** The cover systems will consist of earthen materials engineered to perform a specific function

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
			less than the half life for I-129. The time frames in question are disproportionate by orders of magnitude. The IDEQ believes contaminants with half lives that prohibit the reduction of these contaminants to acceptable levels by natural decay within the 1,000 year design life should be severely limited or excluded from disposal in the ICDF.	in the ICDF that are products of chemical and physical degradation processes over geologic time (millions of years). The 90% Liner and Final Cover Long-Term Performance Evaluation and Final Cover Life Cycle Expectation addresses these natural degradation processes and how they are accounted for once they are part of the cover systems.
			b) The methodology used to develop the WAC for the COCs involves the modeling of individual contaminants, uses dilute starting concentrations in the repository, and assumes linear, and essentially unlimited, adsorption of all contaminants. These assumptions may not be valid or realistic under the conditions for which the soils will be placed in the repository.	**The initial constituent concentrations are based on the dissolution of constituents from the design inventory soil concentration into soil water at a moisture content consistent with 1 cm/year recharge through the waste form. This is a reasonable approximation of the initial aqueous concentrations for the transport simulation. It is noted that these concentrations are not very high.**
			Impacts at the groundwater compliance point from these dilute concentrations of contaminants placed in the repository are linearly scaled upward to develop the acceptance limits. The sorption capacity of the vadose zone below the waste with respect to the total, cumulative mass of all the contaminants placed in the repository is not addressed.	
			An appropriate simulation that should be performed would be to place the estimated acceptance limits of all contaminants (or at least all significant contaminants) into the repository and run the same simulation as was done for the individual groups.	

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
78	Sec 1	1-2, para 2, 3rd sentence	The paragraph references a letter from Talley Jenkins (2001) to Martin Doornbos that states the values to be used for the distribution coefficients (K_d) for contaminants of concern. Please provide a copy of this letter to the IDEQ for review.	A copy of the referenced document will be provided.
79	Sec 2.1	2-1, para 2	The reference to the evaluation of vadose zone model codes in Mann, 1999 and the selection of the STOMP code is misleading. The reference cited is a code selection criteria document only and contains no information regarding the relative merits of the STOMP code in meeting these criteria or if other codes performed as well. The actual scoring information is proprietary and unavailable. The use of the STOMP code in the cited Hanford application has not been released to the public. It is suggested that these sentences be deleted from this paragraph. While the references to the STOMP Theory and User's Guides are useful (since the code was not subjected to any code selection process for the ICDF application as was done at Hanford) additional reference should be made to the STOMP Application Guide (Nichols et al, 1997). This document provides a significant amount of information regarding code validation.	The statements referring to the code selection criteria will be deleted as suggested. Additional discussion on the STOMP Application Guide will be added to the 90% submittal.
80	Sec 2.1	2-5	While the input parameters and grid used in the model simulations are described in varying degrees of detail, the IDEQ requests that the STOMP input files be provided for evaluation.	The STOMP input files will be provided for your review with the 60% revised document.

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
81	Sec 2.1	2-6, last para	Reference is made to curve-fitting of moisture content-pressure relationships in Figure 2-21 in Schafer et al (1997) as the basis of SRPA and vadose zone basalt hydraulic parameters. The success of the curve-fitting exercise should be shown with a figure.	A figure showing the curve fit will be provided as part of the 90% submittal.
82	Sec 2.1	2-6, last para	This sentence states that Table 2-2 presents an explanation of changes from the previous model. However, Table 2-2 does not include any such explanations. Please add this information to Table 2-2. This table should be expanded to show a comparison of soil and hydraulic parameters between current and previous modeling. All of the changes noted as footnotes in the table should be expanded on in the text and a rationale provided.	Explanations regarding the changes made to the previous model will be provided in the revised 60% document.
83	Sec 2.1, Table 2-3		**a)** Please provide a justification for the dispersivity values selected for the media in Table 2-3. The values for the vadose zone layers seem high and intuitively would not be expected to be the same across the media types included. For the saturated zone, considering the short scale of groundwater transport involved (170 m), the SRPA basalt value also seems high. **b)** It is unclear whether any investigation of the numerical dispersion introduced by the STOMP code itself been performed. This be evaluated to avoid adding unrealistic amounts of additional dispersion.	The dispersivity values were selected to be consistent with the previous modeling efforts in the RI/BRA. An evaluation of numerical dispersion in STOMP has not been performed. It is unclear how that could be performed in absence of a non-numerical dispersion baseline. We will include values simulated with 0 dispersivity in the vadose zone in the 90% submittal.

DOCUMENT TITLE: Draft 60 Percent Design, Evaporation Pond Lining Equivalency Analysis, EDF-ER 312

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
84	General	General	The IDEQ has reviewed this engineering design file, and the alternate design to the requirements stated in 40 CFR 264.221 (c), in accordance with the provisions of 40 CFR 264.221 (d) and practices of other surface impoundments operating in the State of Idaho. On the basis of this review, the IDEQ is not approving the proposed design for the following reasons: **a)** The proposed design, which lacks adequate confining pressure over the GCLs in places (i.e., side slopes or when maintenance requires the ponds to be emptied), is subject to differential swelling. Differential swelling could result from: (1) absorption of moisture from the underlying subgrade soils, or (2) liner defects or punctures that allow ponded water to enter the GCLs from above (with zero effective stress at defect locations, the bentonite will swell in the vicinity of the defect). Over the design life, this uncontrolled swelling could compromise the integrity of the liner. **b)** The design does not include adequate frost protection for the GCLs. The EDF cites laboratory and field test data which suggest that GCLs do not undergo increases in hydraulic conductivity as a result of freeze-thaw conditions. However, these studies are based on relatively few freeze-thaw cycles. The WorldIndex cold-weather database, produced by the US Army Corps of Engineers, indicates that Idaho Falls undergoes 158 (mean) freeze-thaw cycles per year. Further, the INEEL is typically five to ten degrees colder than Idaho Falls during the winter. Therefore, the GCL portion of the liner could be subjected to thousands of freeze-thaw cycles over the service life of the impoundment.	***A meeting to discuss/resolve comments on the EP lining system equivalency was held in IDF on November 13, 2001. The meeting was attended by representatives from BBWI, DOE, IDEQ and EPA. A PowerPoint presentation was provided by CH2M HILL to review the evaluation of EP lining alternatives, summarize the equivalency analysis and address IDEQ/EPA comments and concerns. The slides for the PowerPoint presentation are attached to the comment resolution.*** ***Discussion after the presentation focused on alternatives to provide freeze/thaw protection for the GCL components of the alternative lining system. Resolution of this issue was reached by all parties agreeing to the following EP alternative lining system (from top to bottom). IDEQ noted that their final approval was contingent on approval from the Director (which was granted on 11/15/01).*** ***Approved Alternative EP Lining System (top to bottom)*** ***Sacrificial Layer – 60-mil HDPE geomembrane*** ***Primary Liner (upper composite) - 60-mil HDPE geomembrane*** ***Primary Liner (lower composite) - GCL*** ***Leak Detection System (LDS) – consisting of 3 feet of sand/gravel drain material to provide freeze/thaw protection to secondary GCL. LDS thickness will be modeled to determine required thickness. 3-foot thick layer will consist of a minimum 1-foot of material with hydraulic conductivity greater than 0.1 cm/sec.*** ***Cushion Geotextile (12 oz. non-woven)***

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
			Consequently, there is insufficient data to conclude that the GCL would out perform the originally proposed admixture and/or to eliminate the CCL. Further, an acceptable design must provide adequate frost cover to protect GCLs at the pond bottoms and side slopes. **c)** The long term durability of the proposed GCL under INEEL's climatic conditions, especially given hydration concerns discussed above, is unknown. If the GCL were to fail, the reduced attenuative capacity of this liner alone could result in unacceptable risk. While the CCL admixture may suffer some deterioration due to freeze-thaw, the additional attenuative capacity in the three foot CCL layer might overcome this concern. **d)** The proposed HDPE top liner will be exposed to temperatures ranging from –40 degrees F to +140 degrees F. Compared to many liner materials, HDPE has a relatively large coefficient of expansion and contraction. Although polyethylene materials are well suited for burial and temperature-stable environment, the proposed HDPE top liner would be exposed and thus undergo large cyclic strains. Consequently, other materials should be considered for evaluation as a top liner. Given the long-lived nature of some of the contaminants that will be discharged to the pond, and the fact that the ICDF will be built over a sole source aquifer, the IDEQ believes it necessary to weigh protection of the environment more heavily than waste reduction, ease of construction, and a relative cost savings of $80,000. Therefore, redundancy of both system design and quality control is recommended. The Agencies should discuss other design and construction options that could	***Secondary Liner (upper composite) - 60-mil HDPE geomembrane*** ***Secondary Liner (lower composite) – GCL*** ***1-foot low permeability soil – base soil (for landfill soil-bentonite liner) from Rye Grass Flats borrow area. Expected hydraulic conductivity of less than 10^{-6} cm/sec. Placement specifications will have compaction requirements only – no permeability performance specification.*** a) The revised alternative liner system agreed to at the comment response meeting will provide the required confining pressure to eliminate free swell as an issue. The GCL included in the primary liner system is subject to free swell, but the GCL is an additional liner component that is not required by regulations. The GCL will be included only to minimize potential migration of evaporation pond liquids into the soil cover underneath the primary liner system. b) The revised alternative liner system will provide freeze thaw protection for the GCL. c) As referenced in Krause (1997), when CCLs undergo freeze-thaw they develop microcracks. These are pathways through which the contaminants will very quickly migrate. Under these conditions the attenuation capacity of the CCL is short-circuited and irrelevant, as contaminants will not reside in the CCL long enough to be significantly absorbed. It is proposed that a GCL form a component of a composite liner also incorporating a layer of 60 mil HDPE sheet. In fact the proposed composite liner incorporating a GCL is actually a double lined system incorporating two GCLs. To provide additional safety in regards to this issue, 12 inches

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
			improve the protectiveness of the evaporation ponds.	of low permeability soil was included in the revised alternative liner system below the secondary composite lining system. d) Disagree – HDPE is well-suited for exposed applications and provides the best chemical resistance when compared to other lining materials. HDPE is often used in exposed pond lining application primarily because of its excellent resistance against UV degradation (provided by its carbon black content) and low temperature brittleness (< -100 deg F). GSE (Geomembrane manufacturer) has provided us a copy of paper that reports results of forensic study on 100-mil HDPE geomembrane in a Colorado Steam Electric Generating Station lagoon after 20 years of exposure (GSE, 2001). The results show no significant reduction on primary physical properties after 20 years of active service. Additional Hsuan et al (1997) reported the effects of Freeze-thaw cycling on Geomembrane sheets and their seams. Testing was performed on numerous geomembrane materials including HDPE. After 200 freeze-thaw cycles the tensile properties of the geomembrane sheets and seams showed no statistically significant change. We acknowledge that coefficient of linear thermal expansion is higher for HDPE, geomembrane. However proper design and installation of the liner and its anchor trench can address these concerns and eliminate thermal strain on the lining system. Also consider that the ponds are in service for a relatively short time period compared to the landfill and then the ponds will be clean closed or risk-based closed. References: GSE (2001). 20 Year HDPE Forensic Study. Unpublished.

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
				Hsuan, et al (1997). "Effects of Freeze-Thaw Cycling on Geomembrane Sheets and Their Seams". Proceedings Geosynthetics '97. IFAI. Pp. 201-216
85	Sec 1.1	1	Please provide Figure 1-1.	Fig 1-1 will be included in the revised 60% document. It is also attached to the comment response.
86	Sec 1.2	2	The citation 40 CFR 262.221 (c) is incorrect and should be 264.221 (c).	Comment will be incorporated in final 60% submittal.
87	Sec 2.2.1	6	Please provide Figure 2-1.	Fig 2-1 will be included in the revised 60% document. It is also attached to the comment response.
88	Sec 2.2.1.1	8	Please provide a description of how compliance with 40 CFR 264.222 will be met and provide the anticipated Action Leakage Rates for the evaporation ponds. (Giroud and Bonaparte discuss that "flow of liquids through geomembranes is not governed by Darcy's Law" - yet ALRs in EPA regulations assume Darcy's Law).	It should be clarified that the of the intent of this EDF was not as a design document for the EP lining system. It was intended as demonstration of the equivalency of a proposed alternative lining system for the EP. In regards to compliance with 40 CFR 264.222: this regulation requires the regional administrator to approve an ALR and monitoring to determine if the ALR has been exceeded. Discussion of the monitoring of leakage rates from the EP was not the intent of this EDF. Monitoring for the ICDF will be included as part of the O&M package in the 90% RD/RA submittal. Action Leakage Rate (ALR) for the EP will be provided in the 90% RD/RA work plan submittal. Calculations will be similar to those presented for the landfill in Section 4 of EDF-269 (Leachate Generation Study). Generic guidance provided by EPA (1992) for surface impoundments is 1000 gpad. Preliminary calculations following the guidance provided in 264.222 (maximum flow rate that the LDS can remove without fluid head on the liner exceeding 1 foot) is 2000 gpad. This is based on the specified transmissivity of 3 x10-4 m^2/s for the drainage composite in the LDS and

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
				safety factor of 2. ALR is calculated based on Darcy's Law and relates to the drainage capacity of the LDS. One can also calculate the leakage rate through a geomembrane based on Darcy's Law using simplifying assumptions to determine an "equivalent" hydraulic conductivity for the geomembrane. However as pointed at by Giroud & Bonaparte (G&B), the leakage rate due to permeation through geomembranes is very small unless the head is very large (in excess of 100 ft.). Thus G&B present a method to determine the leakage rate through geomembrane defects using the principles of fluid dynamics (Bernoulli's equation) for flow through an orifice. It is valid to compare the leakage rates even if determined by different methods. Reference: USEPA (1992). "Action Leakage Rates for Leak Detection Systems". Supplemental Background Document – EPA 530-R-92-004. Office of Solid Waste.

DOCUMENT TITLE: Draft 60 Percent Design, DOE/ID-10851, Construction Quality Assurance Plan for Phase II Construction

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
89	Sec I – General, Part 2.2.3	I-8, 1st para, 2nd sentence	This sentence states that "At a minimum the weekly progress shall be attended……". It appears that "weekly" was used inadvertently instead of "bi-weekly". Please clarify.	This will be clarified in the revised 60% submittal.
90	Sec II, Table 2-3	II-17, Note 3	This sentence states that "The frequency of pre-compaction tests have been doubled assuming that bentonite mixing will be performed by earth-moving equipment.". Please clarify what is meant by "earth moving equipment", and if this equipment differs from that used for test pad construction.	This will be clarified in the revised 60% submittal.
91	Sec 2.2.2.2	III-4, 2nd para	Please describe how previously-deployed panels will be protected after installation (and acceptance) from inclement weather events.	The Technical Specifications require that the GCL be covered by the overlying liner the same day that it is deployed protecting it from damage and hydration. The working edge of the previously deployed GCL will be inspected by the CQA representative prior to installing more GCL to ensure that it has not been damaged or hydrated.
92	Sec 2.3.2.2	III-4, para	Please state the minimum overlap required for damaged GCL material repair.	The minimum overlap required for damaged GCL material repair will be specified in the Technical Specifications in the 90% design.
93	Sec VIII, Subsec 1.8	VIII-5	Please include a Section that describes the Storage of (archived) Construction Samples.	We would like to discuss the type of material samples that should be archived and necessity of the archive.

DOCUMENT TITLE: Draft 60 Percent Design, NESHAP Modeling, EDF-ER-290

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
94	General	General	**a)** This EDF carefully describes the radiological data input to the model but does not adequately describe the other model parameters. The model inputs including but not limited to the following: receptor array, meteorological data, source terms (area or point), and emission rates of the contaminants of concern should be more fully described and justified in the EDF. **b)** The EDF must be revised to ensure continued compliance with the NESHAP and other air quality standards whenever the isotopic concentrations in the waste received exceed predicted levels (either by concentration or contaminant). **c)** The EDF must re-evaluate the combined emissions associated with the surface impoundment and landfill. The evaluation should correctly locate each unit and model the landfill and surface impoundments as area sources. Should the actual source term differ from what is presented in this EDF, the model must be re-run. If the recalculated dose to the MEI *could* exceed one percent of the NESHAPS standard, monitoring is required in accordance with 40 CFR 61 Subpart H. Further, exceeding the 0.1 millirem dose to the MEI would trigger State of Idaho Potential for Significant Deterioration (PSD) requirements on the INEEL. The ICDF operations would not be impacted by such an event, but all future INEEL air permitting and remedial actions with air concerns would be impacted. INEEL would be required to implement best available control technologies (BACT) for all new or modified units on the site.	a) A detailed modeling description is provided in the annual INEEL NESHAP report. We used a unit Ci run which follows the "INEEL Air Modeling Protocol," C.S. Staley, INEEL/INT-98-00236, Rev. 0, July 1998. A 10-year wind array was used. Since this is an area ground source, it was modeled as such. The source terms are described in detail in the EDF. Emission rates are not applicable. We are only concerned with the annual emission. b) If waste exceeds the design inventory, the waste will be special case and NESHAPS will be revisited. Combined sources were evaluated. The site will be located correctly. Monitoring requirements only apply to point sources – not diffusion sources. All computer runs CAP88 show that the project is about 0.04 mrem – well below 0.1 mrem. d) The ICDF was the location used for the source calculations. INTEC ground level release was used. A new run using the center of the landfill and the center of the evaporation ponds will be evaluated. e) The MEI is an agreed upon location described in the INEEL NESHAPs permit and cannot be arbitrarily moved for each unit. The boundary cannot be extended nor is the purpose of the NESHAP model to model the EBR-1 site or rest area. A description of the INEEL's MEI can be found in the annual NESHAP report. Its location is determined by the

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
			d) The September 24 e-mail string from Chris Staley to Martin Doornbos to the IDEQ suggests the generic INTEC location was used to model the ICDF surface impoundments and landfill. In previous modeling efforts the generic INTEC location has been the main stack. The main stack is located over 800 meters northeast of the proposed ICDF location. The CAP88 model needs to be rerun using separate, properly located area source terms for the landfill and surface impoundments. The location of the Maximally Exposed Individual (MEI) needs to be recalculated based on the corrected plots and revised model runs.	location of the rad emissions and the wind direction for that year. For permitting, the wind file is a 10-year average and we model to the site boundary. This gives a higher dose than modeling to an actual MEI. The boundary is used for internal documents. This is a short term risk assessment issue. Not a NESHAPs issue.
			e) The document must justify why the MEI is located at the point indicated. It appears that data from a previous modeling run was used to set the model boundary at 13,900 meters. The model boundary should extend an additional distance to demonstrate the MEI is correctly located. Further, the on-site risk to the public at EBR-1, the rest area along Highway 20-26 and other select points along the highway should be evaluated to ensure that the ICDF operations do not pose an unacceptable risk to the public.	
			f) The IDEQ suggests that the model should evaluate on-site radionuclide deposition to ensure impacted soils do not exceed established action levels.	
			g) The EDF should evaluate the emissions associated with all activities associated with the ICDF Complex including transportation, treatment and disposal in the ICDF landfill.	g) Excavation and transportation is not an ICDF responsibility until waste enters the gate. It is expected that waste will arrive in closed containers. Emissions from unloading have been calculated.

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
95	Figure 1	9	[NOTE: Original comment called out Figure 1 AND page 9.] The conclusions report the MEI is located on the INEEL property line 13,900 meters from the ICDF units. The map scale is presented in miles only (no metric scale) and the triangle locating the MEI is located at least 1 mile south of the INEEL property line. The map should present both a metric and English scale and the location of the MEI should be accurately plotted.	Map scale will be presented in both metric and English units. MEI locations are shown.
96	Figure 1	10	The ICDF appears to be incorrectly plotted southeast (and east of the rail line) of INTEC rather than southwest of the INTEC fence line.	ICDF will be located correctly.
97	Chapter 4	11	On the basis of the NESHAPs modeling, only leachate and well water as described on page 2 of EDF 290 are approved for discharge to the impoundment.	This is not a NESHAPs issue. It will be addressed in the WAC.

DOCUMENT TITLE: Draft 60 Percent Design, EDF-ER-322, Waste Placement Mapping Plan

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
98	Acronyms	vii	The acronym "*IWTS"* is defined in this list as "*INEEL Waste Tracking System*" and on page 5 as "*Integrated Waste Tracking System.*" We suggest that the text be revised for consistency.	Text will be revised to reflect "Waste Tracking System" in revised 60% document.
99	Sec 1.2.1	1, 1st para under section heading, Items 1 and 2	The referenced text appears to address only the disposal of bulk soil waste loads. Please add language that targets boxes of encapsulated and treated debris.	Boxed or encapsulated debris will be tracked by grids exactly like bulk soil. Text will be revised to include boxes and encapsulated waste in this discussion.
100	Sec 1.2.1	1, 2nd para under section heading	Please note that besides public perception it is a regulatory requirement that DOE knows exactly where each load of waste was placed. Also, the IDEQ inspections will be completed to ensure DOE compliance with 40 CFR 264.309.	Disagree with word "exactly". Wastes will be tracked based on 50' x 50' x 5' three dimensional grids.
101	Sec 1.2.1	1, last para on page	This "disadvantage" could be easily overcome by mounting of the GPS unit on the ICDF landfill dozer. So doing would minimize exposure and eliminate the need for additional personnel to track the coordinates.	Agree. Preferred method is still tracking placement within grids. Accuracy of small GPS units is no better than the grids we have identified. Text will be revised to reflect a GPS unit could be mounted on the dozer, but the recommendations will remain the same.

DOCUMENT TITLE: Draft 60 Percent Design, EDF-ER-323, Evaporation Pond Berm Overtopping Analysis

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
102	General	General	Please confirm that the 2-foot free board is measured from the horizontal top of the pond berm vertically down to the liquid surface.	That is correct.

Comment Clarification – ICDF 60% Design

Comments #11, 14, 15, 16, 19, 20

DOE has requested additional information regarding sites in Idaho where IDEQ has required monitoring of perched aquifers. As mentioned during the comment clarification conference call on October 17, both Motive Power and ESII have been required to monitor perched aquifers. In addition, Motive Power is actively pursuing remediation of the shallow perched aquifer because of contamination caused by organic solvents. Other sites, not inclusive, that also are monitoring perched aquifers include Pressure Treated Timber, Gowen Field, Pacific Corp., and Blount, Inc.

Response: Information noted.

Comment #66

The primary issue driving this comment is dependence on a 1-dimensional analysis and the implications of Figure 2-1. We understand that Figure 2-1 will be modified to clarify the misunderstanding resulting from the locations of the arrows on this figure. The additional references provided on capillary barriers have been reviewed; the references provide useful information but IDEQ does not consider the information site specific to this design. The long term legacy of the ICDF warrants a thorough evaluation specific to this facility. The main issue remaining in the initial comment is the potential breakthrough of infiltration through the capillary barrier. An analytical approach to assess this phenomenon was presented in IDEQ's comment #68 but a comparative modeling effort is lacking. IDEQ proposes that a 2-dimensional model be used to assess the potential for water to break through the capillary barrier. The modeling effort can be simplified to replicate the geometry of the cover and multiple layers but limited to the layers below the effective, practical, depth of evapotranspiration with the assumption the infiltration is nearly steady state. A code such as HYDRUS can be used which was used for a previous modeling effort on this design. IDEQ does not favor the use of the HELP model for this effort. A true hydraulic model is favored such as the suggested HYDRUS.

Response: This topic was discussed during the November 13 – 14, 2001 face-to-face Agency meetings. A formal presentation (handout provided to IDEQ) addressing this issue was provided at that time. As analyzed, the 1-D model does not allow for lateral drainage or frozen ground and therefore, provides a conservative estimate of the recharge to the underlying layers. Lateral drainage was accounted for on top of the clay layer and will be evaluated using a 2-D model, which will be included in the ICDF 90% submittal. Using a model such as HYDRUS would still involve using another model (i.e., Soil Cover) to adequately represent the infiltration at the top of the HYDRUS model. This is not a cost-effective approach and does not provide added value beyond the existing approach.

Comment #77b

It is suggested that an uncertainty discussion be added to the report that describes some of the limitations of the presented modeling effort. The uncertainty discussion can address transport of multiple contaminants, linear isotherms representing probable non-linear processes, competition for adsorption sites, reactions in the subsurface, etc. It is not the intention of IDEQ that DOE obtain a model capable of simulating either reactive transport or the transport of multiple contaminants through the unsaturated or saturated zones. It is IDEQ's desire that the document notes some of the major uncertainties this modeling effort does not address.

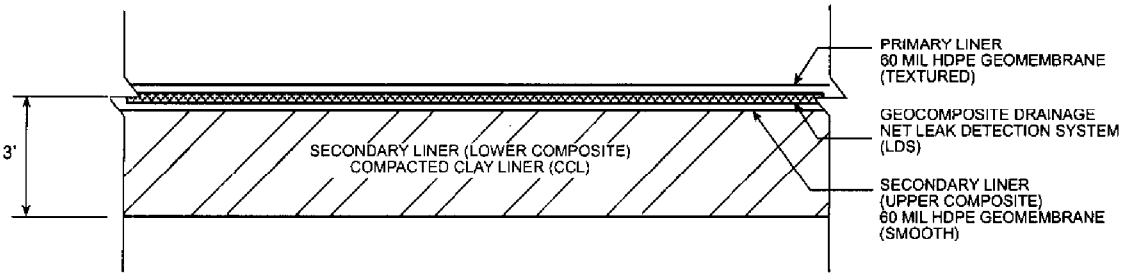
Response: An uncertainty/sensitivity analysis will be included in the ICDF 90% RD/RA Work Plan.

Comment Clarification -- SSSTF 90 % RD/RA Work Plan

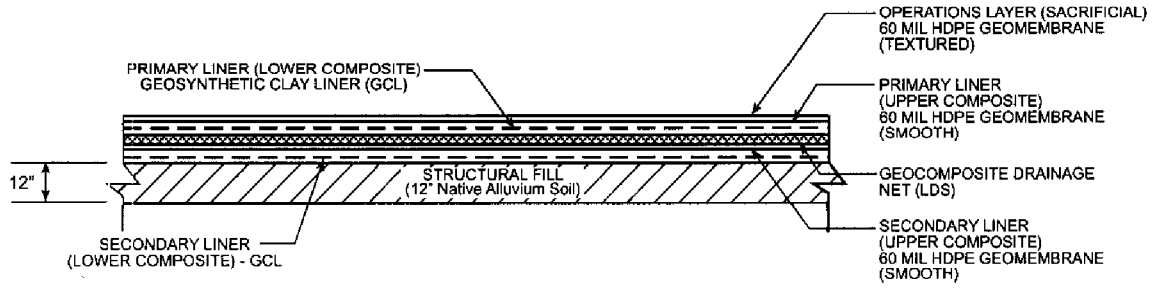
Comment 24

The IDEQ has re-evaluated this issue, and decided to retract this comment.

Response: None required.

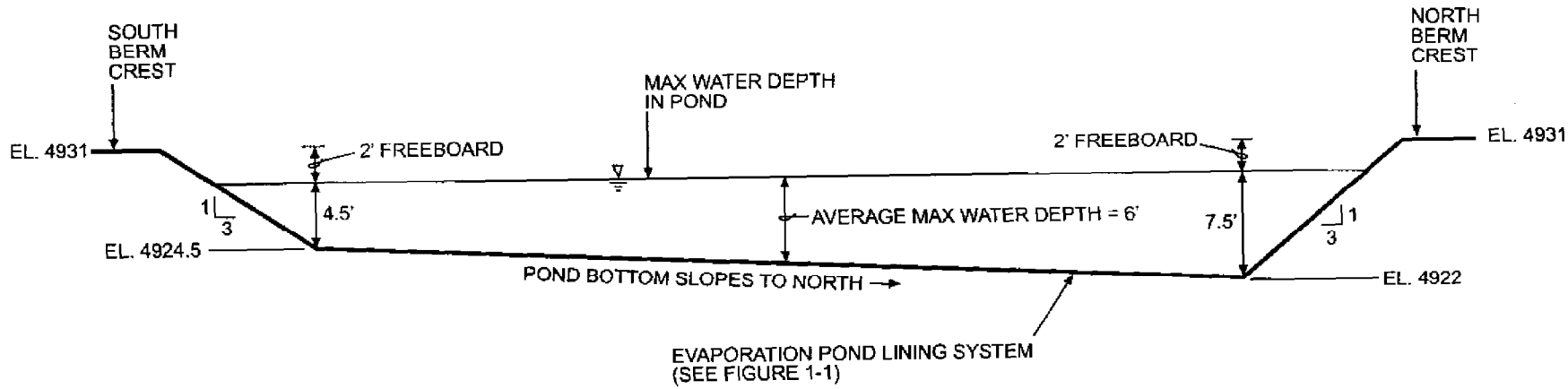


STANDARD RCRA SUBTITLE C DESIGN



ALTERNATIVE DESIGN

Figure 1-1. Evaporation Pond Lining System Sections.



NOTE: Not to Scale

Figure 2-1. Evaporation Pond Lining System Water Depth (N-S Cross-Section)